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Indian Standard
SPECIFICATION FOR
OIL OF CLOVE

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR OIL OF CLOVE

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Indian Standard

SPECIFICATION FOR OIL OF CLOVE

0. F O R E W O R D

0.1 This Indian Standard was adopted by the Indian Standards Institution on 23 November 1972, after the draft finalized by the Natural and Synthetic Perfumery Materials Sectional Committee had been approved by the Chemical Division Council.

0.2 Oil of clove is the volatile oil obtained by steam distillation of the different parts of the evergreen clove tree belonging to Myrtaceae family. The clove tree is cultivated mainly in East African regions such as Madagaskar, Zanzibar, Pemba and the Seychelles. It is also cultivated on a smaller scale in other areas such as Penang and Amboyna.

0.3 Three types of oil of clove, namely, (a) clove bud oil, (b) clove leaf oil, and (c) clove stem oil are available in the world market. In the trade, clove leaf oil and clove stem oil are commonly known as Clove Oil Madagaskar and Clove Oil Zanzibar respectively. This is because Madagaskar is the principal source of clove leaf oil, while Zanzibar is the principal source of clove stem oil.

0.4 Oil of clove is one of the most important essential oils, indispensable for the perfumery and flavour industry. Realizing the economic importance of the oil in the development of indigenous perfumery industry, the Sectional Committee responsible for the preparation of this standard decided to lay down basic requirements for the oil in order to ensure an acceptable quality of the material so largely consumed by Indian industry.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for the material commercially known as the oil of clove of three types, namely, (a) clove bud oil, (b) clove leaf oil, and (c) clove stem oil. Oil of clove bud and clove leaf are suitable for use in perfumery and flavours, while oil of clove stem is chiefly used for the isolation of eugenol.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions of terms given under 2 of IS : 326-1968* shall apply.

3. TYPES

3.1 There shall be three types of the oil of clove, namely, the clove bud oil, clove leaf oil and clove stem oil.

4. REQUIREMENTS

4.1 Oils of Clove Bud, Clove Leaf and Clove Stem — These shall be obtained by steam distillation of dried flower buds, dried leaves or dried stems respectively of clove tree botanically known as *Eugenia caryophyllus* (Sprengal) Bullock et Harrison.

4.2 The clove oil of all the three types shall be a clear liquid, and free from sediment, suspended matter, separated water and added adulterants.

4.2.1 The oil shall be examined for its colour, clarity, separated water, by-notes and sediments as prescribed under 4.1 to 4.5 of IS : 326-1968*.

4.3 Solubility — When tested as prescribed under 8 of IS : 326-1968*. Oil of clove bud shall be soluble in two or more volumes of 70 percent alcohol. Oil of clove leaf shall be soluble in two volumes of 70 percent alcohol. A slight opalescence often occurs when additional solvent is added. Oil of clove stem shall be soluble in two or more volumes of 70 percent alcohol.

4.4 Water Solubles in Clove Oils — The clove oil shall not contain any water soluble component and shall pass the test as given in Appendix A.

4.5 The three types of oil shall also comply with the requirements given in Table 1.

*Methods of sampling and test for natural and synthetic perfumery materials (first revision).

TABLE 1 REQUIREMENTS FOR CLOVE OIL

(Clause 4.5)

SL No.	CHARACTERISTIC	REQUIREMENT			METHODS OF TEST REF TO CL No. IN		
		Clove Bud Oil	Clove Leaf Oil	Clove Stem Oil	Appen- dix	IS:326- 1968*	IS:2284- 1963†
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Colour and appearance	Colourless or a pale yellow liquid when freshly distilled, becoming darker and thicker on ageing or exposure to air	Colourless to pale yellow liquid	Yellow to light brown liquid	—	4.1, 4.2, 4.3, 4.5	—
ii)	Odour	Sweet fruity, spicy	Dry, woody spicy	Strong spicy somewhat fruity woody	—	—	4 & 5
iii)	Relative density at 30°C/30°C	1.035 to 1.057	1.033 to 1.043	1.045 to 1.053	—	5	—
iv)	Optical rotation	0° to -2.0°	0° to -2°	0° to -1.5°	—	6	—
v)	Refractive index at 30°C	1.523 0 to 1.531 0	1.527 0 to 1.531 0	1.531 0 to 1.534 0	—	7	—
vi)	Total eugenol, percent by volume	85 to 90	84 to 88	89 to 95	—	14	—
vii)	Mineral oil	No readable separation of mineral oil			—	16.2	—
viii)	Heavy metals	Shall pass the test for heavy metals			—	16.1	—
ix)	Phenol (carbolic acid)	Shall pass the test			B	—	—

*Methods of sampling and test for natural and synthetic perfumery materials (*first revision*).

†Method for olfactory assessment of natural and synthetic perfumery materials.

5. PACKING AND MARKING

5.1 The material shall be supplied in well-closed containers, preferably glass, tin-lined, stainless steel or aluminium containers as agreed to between the purchaser and the supplier. When galvanized containers are used, a precipitate may result.

5.2 The type of the oil (bud oil or leaf oil or stem oil) shall be marked on each container.

5.3 Percentage of total eugenol content of the material shall be clearly indicated on the label.

5.4 The material shall be stored in a cool and dry place, well protected from light.

5.4.1 The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6. SAMPLING

6.1 Representative samples of the material, each containing not less than 50 ml, shall be drawn as prescribed under 3 of IS : 326-1968*.

6.2 Number of Tests — Tests for the determination of all the characteristics shall be conducted on the composite sample.

6.3 Criteria for Conformity — The lot shall be declared as conforming to the specification if the composite sample satisfies all the requirements specified in the standard.

7. TESTS

7.1 Tests shall be conducted as prescribed in IS : 326-1968*, IS : 2284-1963† and Appendices A and B. Reference to relevant clauses is given in col 7 and 8 of Table 1.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (see IS : 1070-1960‡) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

*Methods of sampling and test for natural and synthetic perfumery materials (first revision).

†Method for olfactory assessment of natural and synthetic perfumery materials.

‡Specification for water, distilled quality (revised).

APPENDIX A*(Clauses 4.4 and 7.1)***TEST FOR FREEDOM FROM WATER SOLUBLES****A-1. APPARATUS**

A-1.1 Graduated Cylinder — 100 ml capacity with ground-glass stopper and graduated in 0.1 ml.

A-2. REAGENTS**A-2.1 Xylene**

A-2.2 Sodium Sulphate Solution — 3 percent.

A-3. PROCEDURE

A-3.1 Measure test sample previously dried with anhydrous sodium sulphate into the clean and dry measuring cylinder so that the volume reads 10 ml correct to 0.1 ml. Add sufficient xylene to the sample so that the total quantity of the liquid reads 20 ml correct to 0.1 ml. Pour about 80 ml of sodium sulphate solution warmed to about 40°C. Stopper the cylinder, shake the contents vigorously for about 5 minutes and allow to settle overnight. Read the volume of the top layer of xylene correct to 0.1 ml.

A-3.1.1 The volume of xylene layer shall be not less than 20 ml.

APPENDIX B*[Table 1, Item (ix)]***TEST FOR FREEDOM FROM PHENOL (CARBOLIC ACID)****B-1. PROCEDURE**

B-1.1 Shake one millilitre of the sample with 20 ml of hot water; the water shows not more than scarcely perceptible acid reaction with blue litmus paper. Cool the mixture to room temperature, pass the water layer through a wetted filter paper and treat the clear filtrate with one drop of solution of ferric chloride. The mixture shall have only a transient greyish-green colour, but not a blue or violet colour.

B-1.1.1 The material shall be deemed to have passed the test if no blue or violet colour develops.

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